The Promises of Participation in Science and Political Ecology

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In our technological age, the sciences occupy an increasingly contested and contradictory position in environmental politics and policy. Consider the case of stratospheric ozone depletion. Here science is at once the means for knowing there is a problem and the source of potential solutions to it. At the same time, however, science, in the form of CFCs, is also the ultimate cause of the problem in the first place. Ulrich Beck is far from alone in seeing a paradox here. In the face of global environmental changes that seem to make them "more and more necessary," the sciences are "at the same time, less and less sufficient for the socially binding definition of truth" (Beck, 1992b: 156).

This same ambivalence runs through the very heart of political ecology. The field emerged in the 1970s and 1980s to offer a more critically inflected and social scientifically-based diagnosis of environmental change and the conflicts to which it often gives rise. In contrast to purely technical analyses of environmental change, political ecologists emphasized its "political sources, conditions and ramifications" (Bryant, 1992: 13). To that end, they critiqued the way that science is often used to naturalize inequality and exploitative socio-natural arrangements. Drawing on currents in academic science studies and poststructural theory, they challenged the objectivity of science and its epistemic privilege to define what passes for nature (Demeritt 1998).

This gave political ecologists a very powerful way to critique established socio-natural arrangements, but it also left their preferred remedies vulnerable to the very same maneuver. Thus demands for reductions in greenhouse gas emissions have met with counter-charges that climate science is too unsettled, socially constructed, and

politically tainted to justify any such action (Demeritt 2006). A number of political ecologists now worry that the pendulum of constructivist critique has swung too far and that there is too much politics and not enough science and ecology in political ecology (Walker 2005; Forsyth 2003). The fear is that without some authoritative basis for knowing about our environmental problems it will be impossible to devise appropriate and publicly acceptable measures to deal with them. This, of course, is the dilemma Ulrich Beck identified as the defining feature of an emergent risk society marked by far-reaching reflexivity and public debate about the grounds for truth and for political action.

One increasingly common response to this challenge is to call for more public engagement in science and science-based policy making. The political ecologist Tim Forsyth (2011: 44), for instance, recently declared, "environmental science must necessarily become more deliberative than commonly practiced… [T]he objectives and basic framings used to underpin scientific research will need to be opened to greater scrutiny." Such calls build on a longstanding tradition of participatory research methods in political ecology for tapping into so-called traditional ecological knowledge (Horowitz this volume), but they are also aligned to some broader claims in human geography and political theory about the need to democratize science through public participation and deliberation (Brown 2009; Whatmore 2009). Such calls are no longer restricted to the ivory towers of academe. From natural resource management to medicine, the rhetoric of public engagement, participation and dialogue has become something of a mantra across a wide sweep of policy fields that were once the exclusive preserve of scientific experts.

However, as such calls have become more widespread, the reasons for them have become more diffuse and poorly defined (Demeritt 2005). The aim of this chapter, therefore, is to clarify the meaning and purposes of public engagement in science and political ecology. In so doing I will try to bring participatory currents in political ecology into conversation with a much wider body of work in academic science studies, political theory, and policy practice on the promises and perils of participation.

Why encourage public participation in science and political ecology?

Calls for public engagement and participation are underwritten by three distinct, if also often intertwined, rationales. First, there are normative arguments about participation as a fundamental democratic right (e.g. Brown 2009; Whatmore 2009). As the Royal Commission on Environmental Pollution (RCEP 1998: 102) put it, "Those directly affected by an environmental matter should always have an accepted right to make their views known before a decision is taken." Defending this right animates much work in political ecology (Peet and Watts 2004). For example, a rich vein of research on nature reserves and biodiversity conservation has exposed the continuity of 'fortress-style' conservation with colonial practices of indigenous dispossession (e.g. Neumann 1998; Peluso 1992). In place of often oppressive systems of natural resource management by (and often *for)* scientific elites, political ecologists have promoted community-based resource management as a more just alternative (Brosius et al. 2005; Zimmerer 1998). Participation gives local people a voice, and so is consistent with procedural ideas of environmental justice as recognition. It is also more attuned to local livelihoods and so is arguably also better placed to secure the just outcomes emphasized by consequentialist theories of environmental justice (Shrader-Frechette 2002).

Second, in response to these normative demands for public participation, many government agencies are themselves now trying to incorporate more participation by the public in their science and science-based policymaking, albeit often for instrumental as much as normative reasons. Participation was a mainstay of Agenda 21, which was formulated at the 1992 UN Conference on Environment and Development (WCED 1987) and has since become a central plank for many international conservation initiatives (Adams 2001). According to the UK government's Council for Science and Technology (CST 2005: para 11), public engagement offers "a more efficient means of developing broadly acceptable policies for issues where the problem of public consent is real, and which cannot readily be sidestepped by a quick fix or political sleight of hand".

It should be clear what a departure this marks from longstanding traditions of technocratic policymaking in which public opposition to any science-based proposals

was attributed to public ignorance and a deficit of scientific knowledge (Sturgis and Allum 2004). The CST (2005: para 6) now acknowledges that "public concerns can rarely be reduced simply to scientific issues", even as it frames dialogue and public engagement as ways of "increasing … public acceptance of specific policy decisions" (CST 2005, para 15). As Alan Irwin (2006: 306) has observed, the participatory turn in science-based policymaking has sometimes failed to acknowledge how public dialogue can "create further grounds for criticism and concern" rather than political consensus. While there is now a growing literature in science studies evaluating public engagement schemes and offering best practice recommendations (i.e. Chilvers 2009), political ecologists have tended to follow Foucault in critiquing these instrumental visions of participation as disciplinary mechanisms for molding individuals into self-regulating "environmental subjects … for whom the environment constitutes a critical domain of thought and action" (Agrawal 2005: 17) In this guise, participation has sometimes been condemned as a new tyranny that coopts people into their own subjugation (Cooke and Kothari 2001).

Third, normative and instrumental rationales for public participation often find common ground in the seductive promise that it will also increase the quality of science and science-based policy. For instance, a recent US National Academy of Sciences report trumpets the importance of public participation in environmental assessment and decision-making for "getting the science right" (Dietz and Stern 2008: 50). Likewise, many political ecologists also insist that community participation in natural resource management will lead to more effective and ecologically sensitive forms of environmental conservation than coercive systems of technocratic management by scientific experts (Adams 2001; Brosius et al. 2005).

Such claims about the substantive contributions of public participation to science and science-based policy are beset by some fundamental ambiguities. To explore them further, I want to return for a moment to Ulrich Beck, both because his theory of reflexive modernization is influential in its own right and because it starkly illustrates the ambiguity

about the wider claims made in science studies and political ecology about the value and purpose of public participation in science and science-based policy.

Beck (1992a: 119) writes:

> The public sphere, in co-operation with a kind of 'public science' would be charged as a second centre of 'discursive checking' of scientific laboratory results.

While superficially attractive, this vision of the public sphere's engagement with science begs some important questions. What kind of "'discursive checking' does Beck hope the public will perform in his "upper house"? As I discuss below, Beck's vision of the substantive contributions of public participation can be understood in two quite different ways.

Participation as normative steering

One way to read Beck's vision of participation is as a kind of normative steering of science (**Figure 1**). Here the role for the public upper house would be to apply the normative "standard 'How do we wish to live?' to scientific plans" (Beck 1992a: 199). In this role, the public or political sphere is responsible for regulating the techno-scientific innovation undertaken in the lower house of science. This vision depends on already established distinctions between the scientific work of discovery and the political work of agreeing on the values to regulate its development and application. Conventionally this normative steering has come after the fact (**Figure 1a**), in the form of restrictions on the socially acceptable use of technology. As such $Beck_2$ may sound more like a description of the status quo than some new, more reflexive modernization, but this apparent contradiction might be resolved if $Beck_2$ were read as a call for 'upstream' public engagement in science itself (**Figure 1b**).

Upstream public engagement was popularized in an influential pamphlet from the London think-tank Demos, (Wilsdon and Willis, 2004). It called for engagement with the public to be moved 'upstream' into the heart of the scientific research process where research agendas can be shaped and steered in publicly acceptable ways, rather than, as has been more typical of 'downstream' public consultations, waiting until after the invention of new technologies before worrying about how to regulate them. For political ecologists, the

idea of upstream public engagement might help to formalize and thereby strengthen the role for the public in their otherwise often rather vaguely articulated appeals to participatory action research as a research methodology.

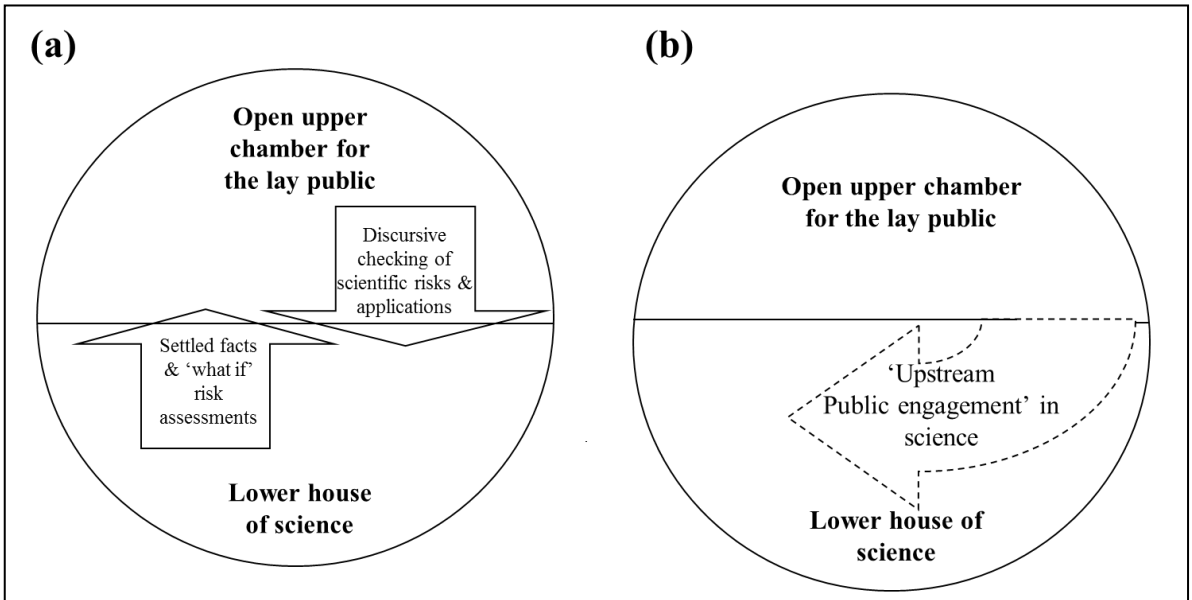

Figure 1. Beck$_2$ vision of participation as 'normative steering' of science. (a) Conventionally this normative steering comes after the fact, in the form of regulations enacted by the upper public, or political, sphere on the socially acceptable use of technological innovations generated by the lower house of science (b) Moving public engagement farther 'upstream' into the research process is intended to provide more effective normative steering of science, blurring the institutional boundaries between science and politics while preserving the metaphysical distinction between facts and values.

Rather than dissolving entirely the distinctions between science and politics, this vision of participation as normative steering would make the institutional boundaries between them more porous while at the same time preserving the epistemic distinction between facts and values. The role for the public would be assessing "the values, visions and assumptions that usually lie hidden [i]n the theatre of science and technology" (Wilsdon and Willis 2004: 24). Public participation here serves a normative role, steering the direction science goes and deciding what goods science should serve, not the epistemic one of judging sound science or evaluating the truth of its epistemic claims. This is a reformist, rather than a

radical agenda, and it is one that is already coming to fruition, in the form of ethical review by institutional review boards and research ethics committees (Dyer and Demeritt 2009), various 'nanodialogues' and other participatory technology assessments (Chilvers 2009), and citizens' juries and other forms of public engagement in science-based policy making (Dietz and Stern 2008), to name just a few.

Two problems, at once of principle and of practice, plague the ideal of participation as normative steering. The first is about representation. How should participants be chosen to ensure that their normative judgments reflect those of the wider public they serve and represent? It is difficult to scale up from small scale deliberative fora, such as the citizen juries conducted in the UK on behalf of the Committee for Radioactive Waste Management (Chilvers 2005), to larger scale national decisions about where and how to store nuclear waste or whether to commission another generation of nuclear reactors. One persistent complaint about public engagement exercises is that they fail to represent the views of the 'silent majority' (Irwin 2006). Similarly political ecologists have noted that participation in community resource management schemes is often skewed towards local elites and can reinforce existing inequalities based on caste, class, and gender (Agrawal 2005). But that same critique might also be turned inwards on political ecology itself, whose paternalistic tradition of radical vanguardism has not always encouraged reflexivity about the effects of its own interventions.

A second closely related problem is about democratic accountability. How can the public license the decisions taken by participants acting in its name but, unlike elected officials, not directly accountable to it through the ballot box? In its response to the CST (2005) report, the UK government enthusiastically endorsed the CST recommendation that the purpose of public dialogues on science "is not to determine but to inform policy… Government must retain responsibility for decision-making." In a representative democracy, governments are accountable in ways that focus group participants are not. In practice, however, the institutional imperative for participatory exercises is often precisely to create enough distance between elected officials and

controversial regulatory decisions to allow for blame avoidance and political deniability. Rather than confronting this problem of political accountability, participation can serve to exacerbate it by adding a new layer of unelected and therefore unaccountable representatives from the lay public to already unelected and weakly accountable regulatory bodies like the HFEA. Indeed, as Rothstein (2007) notes, it is precisely among such unelected and weakly accountable arms of the regulatory state where the enthusiasm for public engagement has been greatest. Likewise in a development context, critics of the participatory turn worry that it tends to reinforce rather than resist hegemonic power (Cooke and Kothari 2001).

But as I have already noted, there is another, much more radical way to understand the substantive contributions of public engagement in science and science-based policymaking.

Participation as epistemic checking

Public participation can also be understood as offering an epistemic challenge to scientific authority (**Figure 2**). For instance, Beck writes:

> Only a strong competent public debate, 'armed' with scientific arguments, is capable of separating the scientific wheat from the chaff (1992a: 119).

Read in this context, Beck's (1992a: 119) claim about the role of the public sphere "as a second centre of 'discursive checking' of scientific laboratory results" can be understood as a truth determining one. Here the role for the public would be to double-check the factual claims made by the lower house of science. This amounts to a conventionalist theory of truth, in which, after (Rorty 1991, 23), science is understood as a form of solidarity and rather than a method of objective inquiry, and "'truth' is simply a compliment paid to the beliefs we think so well justified that for the moment further justification is not needed." In such a world, scientific debate flows seamlessly into political debate. Indeed, the difference between them fades away altogether as epistemological and institutional divides between science and politics, facts and values, are dissolved within an enlarged and invigorated public sphere (**Figure 2a**).

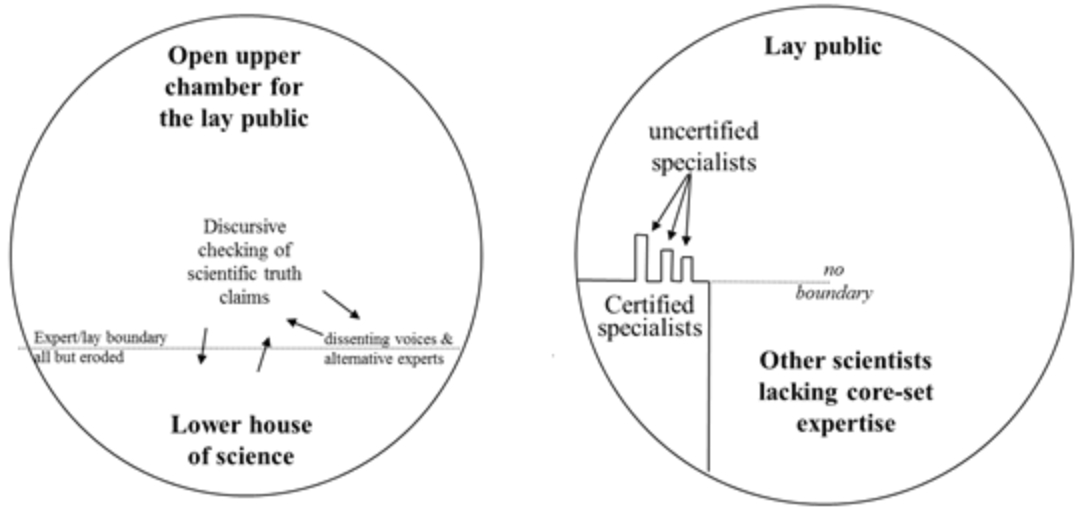

Figure 2. Beck$_1$ vision of participation as 'epistemic checking' of science. (a) In the very strongest versions, the expert/lay boundary is all but eroded, as truth becomes a matter of convention and scientific experts lose their special epistemic warrant. (b) Collins and Evans (2002) preserve the epistemic authority conventionally granted to experts, by refining its basis in experience. They grant epistemic warrant to some uncertified specialists from among the lay public while at the same time denying it to credentialed scientists lacking expertise in the technical matters at hand.

Beck, of course, is far from alone here in arguing that the boundaries between science and politics have been irreparably breached. This is a central theme for a generation of academic science studies (cf. Demeritt 1996) and of post-structural political ecology. Escobar (1998: 54-55), for example, rejected the idea that biodiversity is "a true object that science progressively uncovers" insisting instead that it is a social "construct around which a complex discourse of nature is being deployed…. [to] anchor an entire apparatus for the dispersion of new truths throughout vast social domains." However, critics (i.e. Forsyth 2003) worry that constructivists leave political ecology with no way to distinguish warranted belief from mere opinion: debate about environmental degradation can always be extended by dissenters, however ignorant, ill-informed, or duplicitous their claims.

Harry Collins and Robert Evans (2002) call this the 'problem of extension', and climate change provides a good example of the difficulties it creates. Notwithstanding the robust scientific consensus to the contrary, a host of conservative think tanks and

industry-funded political action committees have spent millions in a slick public relations campaign to deny the risks posed by rising concentrations of greenhouse gases from fossil fuel consumption (Demeritt 2006; cf. Liverman this volume). Pointing specifically to such special interest organized skepticism, Collins and Evans (2002: 280) ask:

> do we never want to say that the tobacco industry has for years falsified … epidemiological studies out of a concern for selling more cigarettes? Do we want to say, rather, that this was just [their] point of view and that the only fight there is to be had with them is a political fight, not a scientific fight?

To solve this problem of extension, Collins and Evans offer a more carefully differentiated definition of expertise, emphasizing experience rather than formal scientific qualifications, as the basis for warranting knowledge claims (**Figure 2b)**. Their approach to expertise provides a basis for some public involvement in epistemic checking of scientific claims by valorizing the knowledge of uncertified specialists from among what had been previously regarded as a uniformly ignorant and unqualified lay public. At the same time Collins and Evans also insist that having a PhD in one specialist area does not qualify you as an expert in others. As a result the line in **Figure 2b** demarcating an expert-scientific realm from a public-political one is jagged to take in "the odd-shaped pockets of expertise found among the lay public" (251) and exclude scientists not possessing the particular expertise necessary to answer the scientific question at hand.

Their idea of uncertified expertise provides one justification for the claim, now widespread in political ecology and science studies, that "public engagement can be essential for 'getting the science right'" (Dietz and Stern 2008: 50). In political ecology, participatory mapping and GIS are now firmly established (Bryan this volume), building on traditions of participatory rural appraisal for involving poor, often marginalized and non-literate groups as co-equal partners in development planning (Chambers 1994). Similar participatory approaches are now being developed to engage non-scientists in the design, testing, and validation of computer simulation models that are so important for many areas of environmental science and policy (e.g. Lane et al. 2011; Millington et al 2011). Public engagement methods are an important addition to the political ecology toolbox of techniques for exploring the integration of nature and society (Zimmerer this

volume), but political ecologists have not always been as clear as Collins and Evans about what, how, and why public participation might be expected to contribute to science and science-based policy or to political ecology studies of them.

There are at least two distinct ways in which participation might make substantive, epistemic contributions to steer science and political ecology. First, members of the public might serve as sources of scientific data and thereby contribute to empirical discovery. Though the spatial imaginary of so-called 'traditional ecological knowledge' typically locates it in less developed parts of the world (cf. Agrawal 1995), in both the US and Europe there have been efforts to enroll the expertise of amateur naturalists in measuring wildlife populations through programmes such as the Great Backyard Bird Count (Toogood 2013). Similarly user-generated data from flood victims is also being used to improve the measurement of extreme flood events, which are otherwise hard for scientists to measure (Demeritt and Nobert 2014; Lane et al. 2011; Parkes et al. 2013). Political ecologists have long celebrated the validity and value of traditional ecological knowledge (Horowitz this volume), but their embrace of participation has also been motivated by the emancipatory desire to move away from extractive relationships to ones of co-production in which research subjects are treated as partners and involved not just in generating data but also in deciding what counts as true and valid.

This points to a second way in the public might contribute to what Funtowicz and Ravetz (1992) call 'extended peer review'. Particularly for 'post-normal' problems "where facts are uncertain, values in dispute, stakes high and decisions urgent" (744), Funtowicz and Ravetz (1992) insist that "public agreement and participation, deriving essentially from value commitments, will be decisive for the assessment of risks and the setting of policy" (751). In a similar way political ecologists have often championed the potential for such 'citizen science' (Irwin 1995) to challenge the hegemony of expert claims about environmental problems such as deforestation (Fairhead and Leach 1996), hydraulic fracturing (Willow and Wylie 2014), and flooding (Whatmore 2009).

However, such claims about the substantive, epistemic contributions of public participation are beset by ambiguities about which members of the public might be qualified to make such contributions and on what basis. For instance Chambers (1994: 954) insists that "poor and exploited people can and should be enabled to conduct their own analysis of their own reality." In so doing he conflates a normative plea for participation as a fundamental democratic right with an epistemological claim that participatory methods involving such marginalized groups "come out better by criteria of cost-effectiveness, validity, and reliability … compared with conventional methods" of expert-led science (956). These different aims imply different kinds of participation from differently defined constituencies.

Participation as democratic right would imply unrestricted participation by any member of the relevant political constituency. While there are important questions about how that constituency should be defined in any given case, it is clear that if participation is a right, then participation rests on identity and political standing, rather than possession of any substantive knowledge or experience beyond membership of the political community itself. But if this is the case, then how can universal participation avoid the problem of extension identified by Collins and Evans (2002)? Chambers provides no explicit answer. His reference to the poor having "their own reality" somehow different from that of "outsiders" whose "reality [often] blanketed that of local people" (963) hints at a post-structuralist sensibility that would regard the resolution of scientific disputes about knowledge as essentially and ultimately a question of power rather than of logical proof or independent empirical validation. While that anti-foundational instinct is something of a commonplace now in political ecology, it belies the more conventional truth claims Chambers makes elsewhere about participation contributing substantively to the epistemic checking of science and science-based policy. Here the claim is not about power effects, but about facts and truth, defined in rather conventional, naturalist terms.

This, in turn, would depend upon restricting participation to those with relevant knowledge to contribute. Such knowledge might be place-based, derived from traditional knowledge of some particular environment or process, or practical, emerging from first-hand experience of the environment. There are also hints here of a standpoint epistemology

whereby marginality itself is imagined as the only valid basis for understanding marginalization (Demeritt 1996). Whatever its precise basis, participation in epistemic checking would seem to depend on knowledge and as such should be restricted to experts, whether certified or otherwise, actually possessing some relevant knowledge to contribute. Of course deciding what knowledge is relevant and thus who might be qualified to contribute to epistemic checking is contestable, but that is a political decision, and as such is, in principle at least, distinct from questions of truth and scientific validity, where participation is restricted to those with knowledge. This is very different to the universal participation in normative steering, which depends on identity and political status rather than knowledge.

Conclusion

Like the fields of environmental science and policy with which it is in critical conversation, political ecology has taken a participatory turn of late, but without always articulating the reasons for that move or the implications that follow from it. Thus, the aim of this chapter has been to clarify the various competing rationales for embracing public participation in science and political ecology. In particular, I showed how normative claims for participation as some kind of basic right of those affected sit uncomfortably alongside other more instrumental and substantive claims that public participation will also somehow increase the quality and legitimacy of scientific knowledge and of the policy decisions informed by that knowledge. These different rationales are in marked tension with one another. They imply engaging in different ways with differently constituted publics to different ends. Sharper distinctions are required here because without them the tendency will be both for the promises of participation to be oversold and for public engagement plans to be ill-suited to the specific contexts and contributions for which they are intended.

To that end, I distinguished two very different ways in which public participation might contribute substantively to science and science-based policy, which I termed normative steering and epistemic checking. Whereas the former promises to provide the moral compass needed to steer their development in democratically legitimate ways (and as

such is continuous with some normative claims for participation as democratic right), the latter contributes new information and quality assurance procedures to ensure their truth and reliability and as such is restricted to those possessing relevant knowledge to contribute.

Arguably this is much too tidy a distinction. After all, political ecology was founded on the recognition that distinctions between science and politics are not self-evident and ontologically given but precariously and problematically *made* (Lave this volume). It was that realization that science already reflects certain tacit political values and power structures that gave rise to calls for participation as a way of challenging them.

However, those critiques are doomed to fail without greater clarity about the different kinds of public warrant involved in making different sorts of political ecology critique. Normative critiques of science and of the injustice of particular environmental policies are properly political questions for the public in general. Political ecologists have often been quick to unveil the values underpinning the science-based claims of others, but they have not always been terribly reflexive about whether their *own* research programmes meet with the approval of the people in whose name they are acting (see Sundberg, this volume). Political ecology's paternalistic tradition of radical vanguardism tends to close off the sorts of questions about the purposes, framing, and funding of political ecology research, which the idea of normative steering is supposed to open up to wider public scrutiny. Political ecologists have typically treated representativeness as an epistemological question about how truthfully they are reflecting the views and values of those they study, rather than a political one about their own accountability to the publics they purport to speak for and to. While institutional review boards and ethical review ensure the accountability of political ecology to a universalized coda of research ethics based on liberal ideas of individual informed consent (Holden and Demeritt 2008), upstream public engagement provides a way to formalize often vague claims about participatory action research methodologies by giving those involved a mechanism for playing a more active role in framing the aims and methods of political ecology. Opening up political ecology to normative steering by the public would thus involve relinquishing some of the autonomy and academic freedom traditionally enjoyed by academic researchers, but it might also provide new opportunities to articulate

the wider public purposes of political ecology and in the process, perhaps, expand the breadth and depth of its public appreciation.

Opening up the substantive factual claims of political ecology to participatory challenge is potentially even more radical. In its very strongest form, it would dissolve any epistemic or institutional distinction between scientists and citizens into a vastly expanded public debate in which science carries no special epistemic status and extended public participation is required because truth is a matter of convention, determined through persuasion, popularity, and power, rather than by expert judgments about its correspondence to the independent reality it purports to represent. While the claims of post-structural political ecologists like Escobar (1998) about undecidability and the social construction of knowledge and nature can certainly be read in this very radical neo-Kantian way (Demeritt 1998), it is noteworthy that they are typically rendered in a fairly conventional register, with direct quotations, footnotes, and the whole architecture of academic referencing offering themselves up for evaluation not as imaginary, but realistic worlds, in the fashion of fiction, but rather as actual worlds, faithfully represented. Seen in this light it may be that some of the concerns about relativism are overblown and that poststructuralists are not nearly as radical as they claim to be. Nevertheless, for many political ecologists, this radical version of public participation as epistemic checking strays too close to relativism. They worry that the field needs some foundation for warranting belief and preventing the extension of debate by dissenters, however ignorant, ill-informed, or duplicitous their claims. While they embrace the potential for uncertified experts to use their experiential or traditional knowledge to contribute to political ecology, they limit such participation to those possessing some relevant to knowledge to contribute. This more modest vision of public participation as epistemic checking challenges the monopoly of experts on epistemic authority, but it is does not challenge the traditional grounds for evaluating the truth of those claims.

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